

Forced to cooperate

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Forced to Cooperate

Mechano-Chemical Interactions in Cardiac Sarcomeres

Propositions

1. We must continue to challenge generally accepted but unproven principles (Chapter 2).
2. Mechanical tension boosts baseline chemical cooperativity in the activation of the cardiac thin filament (Chapter 2).
3. Deactivation of troponin complexes on the cardiac thin filament occurs latest in the regulatory units closest to the Z-disk because these units are under highest tension (Chapter 3).
4. The combination of information derived from electrical signals like the ECG and mechanical signals such as tissue strain patterns is necessary to understand cardiac function and dysfunction (Chapter 5).
5. Model complexity must depend on the problem being solved.
6. For a computational model to be useful in the clinic, it must be simple enough to enable simulations in a short period of time while still representing relevant physiological and physical principles.
7. Computational modeling promotes the development of hypotheses that cannot yet be assessed due to current limits of experimental techniques.
8. While computational modeling cannot completely replace animal experimentation in the foreseeable future, it can be used to develop more targeted hypotheses, thus reducing the necessary number of animal experiments.
9. Scientific breakthroughs age like wine; some become more developed with time while others must be dumped.
10. "Simple it's not, I'm afraid you will find, for a mind-maker-upper to make up his mind." – *Dr. Suess*

Lauren J. Dupuis
9 November, 2018